

What is claimed is:

1. A melt processable fluorothermoplastic composition comprising a major amount of a first semi-crystalline fluorinated copolymer and a minor amount of a second fluoropolymer effective to reduce melt defects in the composition, each fluoropolymer being selected from:
- 5 (a) a semi-crystalline perfluorinated copolymer;
- (b) a fluoropolymer derived from interpolymerized units of at least one essentially perfluorinated monomer and at least one non-fluorinated hydrogen-containing monomer; (c) a fluoropolymer derived from interpolymerized units of at least one partially-fluorinated monomer, and optionally at least one essentially perfluorinated monomer; and
- 10 (d) an amorphous copolymer of tetrafluoroethylene and hexafluoropropylene;
- wherein when the first fluoropolymer is selected from (a), the second fluoropolymer is a semi-crystalline fluoropolymer selected from (b) and/or (c);
- when the first fluoropolymer is selected from (b), the second fluoropolymer is selected from (a), (c), and/or (d); and
- 15 when the first fluoropolymer is a copolymer selected from (c), the second fluoropolymer is selected from (a), (b), and/or (d).
2. The composition of claim 1 wherein the first fluorinated copolymer comprises a semi-crystalline perfluorinated copolymer.
- 20 3. The composition of claim 2 wherein the first fluorinated copolymer comprises a copolymer of TFE with HFP and/or a PAVE.
- 1, 2 -
4. The composition of claim 3 wherein the level of HFP is from about 10 to about 20% by weight.
- 25 5. The composition of claim 3 wherein the level of PAVE is from about 2 to about 10% by weight.
- 30 6. The composition of claim 2 wherein the second fluoropolymer comprises a fluoropolymer derived from interpolymerized units of at least one essentially perfluorinated monomer and at least one non-fluorinated hydrogen-containing monomer, and/or a fluoropolymer derived from interpolymerized units of at least one

partially-fluorinated monomer, and optionally at least one essentially perfluorinated monomer.

5 7. The composition of claim 6 wherein the perfluorinated monomer comprises TFE and/or HFP and the non-fluorinated hydrogen-containing monomer comprises ethylene and/or propylene.

10 8. The composition of claim 7 wherein the level of non-fluorinated hydrogen-containing monomer is about 10% by weight or greater.

9. The composition of claim 6 wherein the second fluoropolymer is derived from interpolymerized units of TFE and ethylene, and optionally HFP, a PAVE, and/or PFBE.

15 10. The composition of claim 6 wherein the second fluoropolymer is derived from interpolymerized units of TFE and propylene.

11. The composition of claim 3 wherein the second copolymer is derived from interpolymerized units of TFE and ethylene, and optionally HFP, a PAVE, and/or PFBE.

20 12. The composition of claim 1 wherein the first fluorinated copolymer comprises a fluoropolymer derived from interpolymerized units of at least one essentially perfluorinated monomer and at least one non-fluorinated hydrogen-containing monomer.

25 13. The composition of claim 12 wherein the first fluoropolymer is derived from interpolymerized units of TFE and ethylene, and optionally HFP, PPVE-1, and/or PFBE.

30 14. The composition of claim 12 wherein the second fluoropolymer comprises a semi-crystalline perfluorinated copolymer; and/or a fluoropolymer derived from interpolymerized units of at least one partially-fluorinated monomer, and optionally at least one essentially perfluorinated monomer.

15. The composition of claim 14 wherein the second fluorinated copolymer comprises a copolymer of TFE with HFP and/or a PAVE.
- 5 16. The composition of claim 1 wherein the first fluorinated copolymer comprises a fluoropolymer derived from interpolymerized units of at least one partially-fluorinated monomer, and at least one essentially perfluorinated monomer.
- 10 17. The composition of claim 16 wherein the partially fluorinated monomer comprises VF2 and the essentially perfluorinated monomer comprises TFE, HFP, and/or a PAVE.
18. The composition of claim 16 wherein the first fluorinated copolymer comprises interpolymerized units of VF2, TFE, and HFP, and optionally a PAVE.
- 15 19. The composition of claim 17 wherein the amount of VF2 comprises from about 5 to about 40% by weight.
20. The composition of claim 17 wherein the amount of VF2 comprises from about 5 to about 20% by weight.
- 20 21. The composition of claim 16 wherein the second fluoropolymer comprises a semi-crystalline perfluorinated copolymer; and/or a fluoropolymer derived from interpolymerized units of at least one essentially perfluorinated monomer and at least one non-fluorinated hydrogen-containing monomer.
- 25 22. The composition of claim 1 wherein the first fluoropolymer comprises interpolymerized units of TFE, HFP, and from about 5 to about 20% by weight of VF2, and the second copolymer comprises interpolymerized units of ethylene and/or propylene, and TFE and/or HFP.
- 30 23. The composition of claim 1 wherein the minor fluoropolymer further comprises an amorphous fluorinated copolymer derived from interpolymerized units of a perfluoro (alkoxy vinyl) ether and a comonomer which may be partially or fully fluorinated;

and/or

an amorphous fluorinated copolymer derived from interpolymers of at least 3 mole percent (mol%) of an hydrogen containing comonomer, and a perfluoro (alkoxy vinyl) ether and/or a perfluoro (alkyl vinyl) ether.

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24. A melt processable fluorothermoplastic composition comprising a major amount of a semi-crystalline fluorinated copolymer and a minor amount of a fluoropolymer effective to reduce melt defects in the composition, the second fluoropolymer being selected from:

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(a) an amorphous fluorinated copolymer derived from interpolymers of a perfluoro (alkoxy vinyl) ether and a comonomer which may be partially or fully fluorinated; and/or

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(b) an amorphous fluorinated copolymer derived from interpolymers of at least 3 mole percent (mol%) of an hydrogen containing comonomer, and a perfluoro (alkoxy vinyl) ether and/or a perfluoro (alkyl vinyl) ether.

25. The composition of claim 24 wherein the minor fluoropolymer comprises at least about 5 mol% of an hydrogen containing comonomer.

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26. The composition of claim 24 wherein the minor fluoropolymer comprises a perfluoro (alkoxy vinyl) ether wherein the alkoxy group contains 2 to 6 carbon atoms.

27. The composition of claim 24 wherein the minor fluoropolymer comprises a perfluoro (alkyl vinyl) ether wherein the alkyl group contains 1 to 5 carbon atoms.

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28. The composition of claim 24 wherein the minor fluoropolymer comprises a hydrogen containing comonomer selected from vinylidene fluoride, trifluoroethylene, ethylene, propylene, and combinations thereof.

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29. An article comprising the composition of claim 1.

- ✓ 30. The composition of claim 1 in the form of a container, film, hose, tubing, or wire coating.

31. A method of improving extrusion properties in an extrudate comprising
(a) blending a major amount of a first semi-crystalline fluoropolymer and a minor
amount of a second fluoropolymer effective to improve extrusion properties in the composition,
5 and
(b) melt processing the blend to form the extrudate, wherein each fluoropolymer is
selected from class:

- (i) a semi-crystalline perfluorinated copolymer;
- (ii) a fluoropolymer derived from interpolymerized units of at least one
10 essentially perfluorinated monomer and at least one non-fluorinated
hydrogen-containing monomer;
- (iii) a fluoropolymer derived from interpolymerized units of at least one
partially-fluorinated monomer, and optionally at least one essentially
perfluorinated monomer;
- (iv) an amorphous fluorinated copolymer derived from interpolymerized
15 units of a perfluoro (alkoxy vinyl) ether and a comonomer which may be
partially or fully fluorinated, and/or an amorphous fluorinated copolymer
derived from interpolymerized units of at least 3 mole percent (mol%) of
an hydrogen-containing comonomer, and a perfluoro (alkoxy vinyl) ether
and/or a perfluoro (alkyl vinyl) ether; and
- (v) an amorphous copolymer of tetrafluoroethylene and
20 hexafluoropropylene;

wherein when the first fluoropolymer is selected from (i), the second fluoropolymer is a
fluoropolymer selected from at least one material of class (ii), a semi-crystalline material
25 of class (iii), and/or a material from class (iv);

when the first fluoropolymer is selected from (ii), the second fluoropolymer is selected
from (i), (iii), (iv) and/or (v); and

when the first fluoropolymer is a copolymer selected from (iii), the second
fluoropolymer is selected from (i), (ii), (iv) and/or (v).

32. The method of claim 31 wherein the first fluorinated copolymer comprises a semi-
crystalline perfluorinated copolymer.

33. The method of claim 32 wherein the second fluoropolymer comprises a fluoropolymer derived from interpolymers of at least one essentially perfluorinated monomer and at least one non-fluorinated hydrogen-containing monomer;
- 5 a semicrystalline fluoropolymer derived from interpolymers of at least one partially-fluorinated monomer, and optionally at least one essentially perfluorinated monomer; and/or
- 10 an amorphous fluorinated copolymer derived from interpolymers of a perfluoro (alkoxy vinyl) ether and a comonomer which may be partially or fully fluorinated, and/or an amorphous fluorinated copolymer derived from interpolymers of at least 3 mole percent (mol%) of an hydrogen containing comonomer, and a perfluoro (alkoxy vinyl) ether and/or a perfluoro (alkyl vinyl) ether.
34. The method of claim 31 wherein the first fluorinated copolymer comprises a fluoropolymer derived from interpolymers of at least one essentially perfluorinated monomer and at least one non-fluorinated hydrogen-containing monomer.
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35. The method of claim 34 wherein the second fluoropolymer comprises a semi-crystalline perfluorinated copolymer; and/or
- 20 a fluoropolymer derived from interpolymers of at least one partially-fluorinated monomer, and at least one essentially perfluorinated monomer.
36. The method of claim 34 wherein the second fluoropolymer comprises an amorphous fluorinated copolymer derived from interpolymers of a perfluoro (alkoxy vinyl) ether and a comonomer which may be partially or fully fluorinated, and/or an amorphous fluorinated copolymer derived from interpolymers of at least 3 mole percent (mol%) of an hydrogen containing comonomer, and a perfluoro (alkoxy vinyl) ether and/or a perfluoro (alkyl vinyl) ether.
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37. The method of claim 31 wherein the first fluorinated copolymer comprises a fluoropolymer derived from interpolymers of at least one partially-fluorinated monomer, and at least one essentially perfluorinated monomer.
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38. The method of claim 37 wherein the second fluoropolymer comprises
a semi-crystalline perfluorinated copolymer;
a fluoropolymer derived from interpolymers of at least one essentially
perfluorinated monomer and at least one non-fluorinated hydrogen-containing
monomer; and/or
an amorphous fluorinated copolymer derived from interpolymers of a perfluoro
(alkoxy vinyl) ether and a comonomer which may be partially or fully fluorinated,
and/or an amorphous fluorinated copolymer derived from interpolymers of at
least 3 mole percent (mol%) of an hydrogen containing comonomer, and a perfluoro
(alkoxy vinyl) ether and/or a perfluoro (alkyl vinyl) ether.
39. The method of claim 31 wherein the improved extrusion property is selected from
reduced melt defects, reduced extruder torque, reduced extrusion pressure, improved
surface properties, and combinations thereof.
40. The method of claim 31 wherein the minor amount of second fluoropolymer comprises
less than about 1 part by weight of the blend.